Santa Clara Fire Department

Spray Booth Installation

PURPOSE

The intent of this guideline is to provide the information necessary to ensure that the design and installation of spray booths will comply with the applicable provisions of the 2007 California Fire Code (CFC), the 2007 California Building Code (CBC), and locally adopted ordinances enforced by the Santa Clara Fire Department (SCFD).

SCOPE

A spray booth is a mechanically ventilated appliance provided to enclose or accommodate a spraying operation, to confine and limit the escape of spray, vapor and residue, and exhaust it safely. Spray booths are manufactured or constructed in a variety of forms to control the unique hazards associated with flammable sprays and vapors.

This guideline is applicable to any spray booth in which spraying operations utilizing flammable or combustible liquids and combustible powders are conducted, per CFC.

SUBMITTAL REQUIREMENTS

1. Review and Inspection Process:

A minimum of three sets of plans and the appropriate equipment data sheets for the spray booth(s) shall be reviewed and approved by SCFD prior to installation. These plans shall be drawn with all dimensions identified or drawn to scale, and they must demonstrate compliance with the CFC, CBC, and the provisions in this guideline.

The storage, use, and handling of flammable and combustible liquids shall be in accordance with CFC Chapter 34. A chemical inventory shall be provided for SCFD review. CFC 1503.3

Plans for the extinguishing system required in the booth shall be submitted by a licensed fire protection contractor (C16 license) responsible for the work. CFC 1504.4

Following the plan review process, contact SCFD at (408) 615-4970 to schedule an inspection to verify compliance with the approved plans, codes, and standards and to witness testing of any chemical based fire extinguishing system.

2. Permits:

A permit is required for spraying or dipping operations utilizing flammable or combustible liquids or the application of combustible powders regulated by the CFC. Prior to issuance of this permit, plans that detail compliance with the applicable codes must be submitted to the City of Santa Clara Building Department **and** SCFD for review and approval. A permit to operate is issued after the booth and extinguishing system have been installed, inspected, and approved. The permit is reissued annually. The business owner/permittee is responsible for remitting the CFC permit fees upon receipt of the invoice. CFC 1501.2

3. Submittal Requirements:

A. Plans for spray booths shall be submitted to SCFD for review and approval prior to installation.
B. Provide a minimum of three copies of the plans.

Office of The Fire Marshal ▪ 1675 Lincoln St ▪ Santa Clara, CA 95050 ▪ Tel: (408) 615-4970 ▪ Fax: (408) 241-3006
Hazardous Materials Division ▪ Tel: (408) 615-4960 ▪ Fax: (408) 241-3006

C. The fire protection system must be designed by a C-16 contractor.
D. Plans shall be legible, scaled to nationally recognized standards, and printed as a blue or black line drawing. The SCFD does not accept either pen and ink plans or pen and ink changes to blue line plans.
E. Submit a completed SCFD Permit Application, which can be obtained at the Fire Marshal's Office which is located at 1675 Lincoln Street, Santa Clara or on the City of Santa Clara website at www.santaclaraca.gov.
F. Submit appropriate fees: $692 per system.
G. General Requirements:
    i. Spray booths shall be substantially constructed of steel not less than 0.0478 inches (18 gauge) in thickness or other approved noncombustible material. CFC 1504.3.2.1
    ii. The aggregate area of spray booths in a building shall not exceed the lesser of 10% of the area of any floor of the building or the basic area allowed for a Group H, Division 2 occupancy, without area increases, as set forth in CBC Table 5B.
    iii. The area of any individual spray booth in a building shall not exceed the lesser of the aggregate size limit or 1500 square feet. CFC 1504.3.2.6
    iv. Spray booths shall be separated from other operations by not less than three feet, by a wall or partition, or by a greater distance as required by the Fire Chief when specific conditions are defined. CFC 1504.3.2.5.
    v. All portions of spray booths shall be readily available for cleaning, and a clear space of not less than three feet around the booth shall be kept free of storage or combustible materials. The space required for cleaning would no longer be required if the space adjacent to the wall or partition is sealed. CFC 1504.3.2.5.
    vi. Exit doors from pre-manufactured paint spray booths shall not be less than two feet six inches wide by six feet eight inches tall. CFC 1504.3.2.4.
    vii. Areas Subject to Overspray Deposits – Electrical equipment in spraying areas that is located such that deposits of combustible residues could readily accumulate shall be specifically approved for locations containing deposits of readily ignitable residue and explosive vapors. CFC 1503.2.1.4.
    viii. Areas Not Subject to Overspray Deposits – Electrical wiring and equipment not subject to deposits of combustible residues, but located in a spraying area, shall be of an explosion proof type approved for use in a Class I, Division 1 hazardous location in accordance with the electrical code. CFC 1503.2.1.2.
    ix. Electrical wiring, motors, and other equipment located outside of, but within 20 feet of a spraying area and not separated from the spraying area by partitions, shall not produce sparks under normal operating conditions. Such areas shall be considered a Class I, Division 2 hazard in accordance with the electrical code. CFC 1503.2.1
        1. Class I or Class II, Division 1 Locations:
            a. All interior locations of spray booths and rooms except as specifically provided in Section 5163(d) of the NEC for portable equipment.
            b. All interior portions of exhaust ducts.
            c. All areas in the direct path of spray operations.
        2. Class I or Class II, Division 2 Locations:
            a. All space outside of, but within 20 feet horizontally and 10 feet vertically of, the Class I, Division 1 location for open spraying, and separated by partitions.
            b. Locations outside of spraying operations conducted within a closed top, open face, or open front booths or rooms extending from the edge of the open face or open front of the booth or room as follows (Figure 1).
            c. Locations measuring 5 feet horizontally and 3 feet vertically when the exhaust ventilation system is interlocked with the spray application equipment.
            d. Locations measuring 10 feet horizontally and 3 feet vertically when the exhaust ventilation system is not interlocked with the spray application equipment.
            e. Locations measuring 3 feet vertically above the booth and within 3 feet of other booth openings when spraying operations are conducted within an open top spray booth (Figure 2).

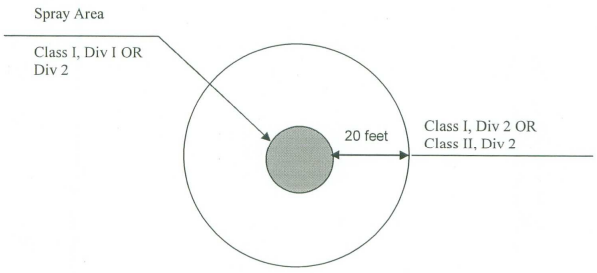
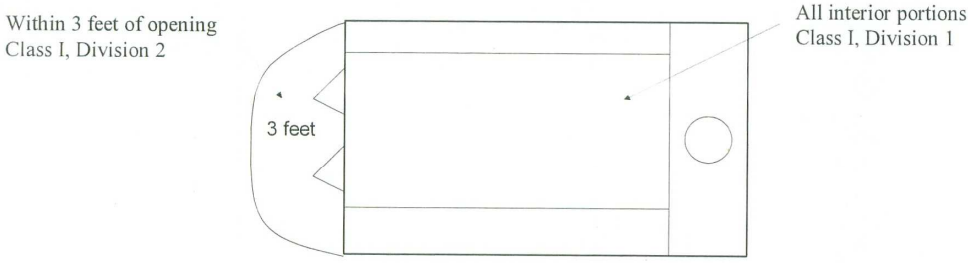


Figure 1



Typical Enclosed Vehicle Spray Booth (plan view)

Figure 2

H. Ventilation:

i. Each spray booth shall have an independent exhaust system discharging to the building exterior. CFC 1504.7.5.

ii. Electric motors driving exhaust fans shall not be placed inside booths or ducts. Fan rotating elements shall be nonferrous or non-sparking or casings shall consist of or be lined with such material. Belts shall not enter ducts or booths unless belts and pulleys within a duct or booth are tightly enclosed. CFC 1504.7.7.

iii. Exhaust ducts shall be constructed of steel having a thickness in accordance with CMC Table 55.

iv. The termination point for exhaust ducts shall not be less than the distances shown in the following table.

Duct Type	Distance:				
	From property line	**From openings into the building**	**From exterior walls or roofs**	**From combustible walls or openings into the building which are in the direction of the exhaust discharge**	**Above adjoining grade**
Ducts conveying explosive or flammable vapors, fumes or dust	30’	10’	6’	30’	10’
Other product conveying outlets.	10’	10’	3’		10’
Environmental air duct exhaust	3’	3’			

v. Exhaust ducts shall have a clearance from combustible construction or material of not less than 18 inches. CMC 506.7

vi. When combustible construction is provided with the following protection features applied to all surfaces within 18 inches of the exhaust duct, clearances shall not be less than those indicated below: CMC 507.2

Protection	Clearance
0.013 inch (28 gauge) sheet metal on 1/4" insulating millboard	12 inches
0.013 inch (28 gauge) sheet metal on 1/8" insulating millboard spaced out one inch on non-combustible spacers	9 inches
0.027 inch (22 gauge) sheet metal on 1-inch rock wool batts reinforced with wire mesh or the equivalent	3 inches

vii. Cleanout openings shall be provided at intervals that allow thorough cleaning of ducts. Cleanout openings shall have tight fitting, sliding or hinged doors with metal equal to or greater than the thickness of the duct or pipe, and the doors shall latch tightly. 2003 NFPA 33 Section 7.9

I. Fire Protection Equipment:
   i. Spray booths and spraying rooms shall be protected by approved automatic fire extinguishing systems. These systems shall be extended to protect exhaust plenums, exhaust ducts, and both sides of dry filters when such filters are used. CFC 1504.4
   ii. If a building's sprinkler system is monitored for water-flow by a central monitoring station, and the same fire sprinkler system is used to protect the spray booth, then the valve for the sprinkler system required for the spray booth shall have a tamper switch. CFC 903.4

J. Drying Apparatus:
   i. The spraying apparatus, drying equipment, and ventilating system for the spray booth or spraying room shall be equipped with suitable interlocks which shall (CFC 1504.6.1.2.1):
      1. Prevent the operation of spraying apparatus while drying operations are in progress.
      2. Purge spray vapors from the spray booth or spraying room for a period of not less than three minutes before drying apparatus can be operated.
      3. Have the ventilating system maintain a safe atmosphere within the spray booth or spraying room during the drying process and automatically shut off drying apparatus in the event of a failure of the ventilating system.
      4. Automatically shut off the drying apparatus if the air temperature within the booth exceeds 200ºF, when other than portable infrared drying apparatus is used.

K. Required Notes:
   i. Copy the SCFD required notes, verbatim, on the plans (see next page).

SCHEDULING INSPECTIONS

A. Inspection appointments can only be made by the installing contractor.
B. It is the responsibility of the installing contractor or a representative to be on the job site during the inspection with a set of approved plans. Failure to do so will result in the cancellation of the inspection and an assessment of a re-inspection fee of $150.00 will be assessed.
C. Call (408) 615-4970 at least one business day prior to the desired date of the inspection. Inspections are assigned on a first come first served basis. The inspection request line is open Monday through Friday between 8:00 a.m. and 5:00 p.m.

SMART PERMIT INFORMATION SYSTEM

The City of Santa Clara offers you the opportunity to check the status of you fire permits on-line. To access the Smart Permit Information System please log onto the system at:

http://santaclaraca.gov/community/smt_permit_information.html

You can search the system using your Case Number (Permit number; fir2008-00001), Project Name, Applicant Name or the address of the project.

SANTA CLARA FIRE DEPARTMENT – SPRAY BOOTH INSTALLATION NOTES

Place all of the following notes, verbatim, on the plans:

1. SCFD final inspection required before the booth can be used. Call (408) 615-4970 to schedule inspection.
2. Smoking shall be prohibited in spray finishing areas and in the vicinity of dip tanks. “NO SMOKING” signs shall be conspicuously posted in such areas. CFC 1503.2.6.
3. Welding warning signs shall be posted in the vicinity of spraying areas, dipping operations, and paint storage rooms with the following warning: “**NO WELDING** — The use of welding and/or cutting equipment in or near this area is dangerous because of fire and explosion hazards. Welding and cutting shall be done only under the supervision of the person in charge. *CFC 1503.2.7.*”
4. Electrical wiring and equipment shall be in accordance with CFC 15, NFPA 70, and the National Electrical Code. CFC 1503.2.1.
5. Interior surfaces of spray booths shall be smooth and continuous without edges and otherwise designed to prevent pocketing of residue, to allow free passage of exhaust air from all pockets of the interior, and to facilitate washing and cleaning without injury. CFC 1504.3.2.2.
6. Floors shall be of noncombustible material or shall be covered with a noncombustible, non-sparking material of such character to facilitate safe cleaning and removal of residue. CFC 1504.3.1.1.
7. When spray booths are illuminated, fixed lighting units that transmit light into the spray booth through heat-treated or hammered wire glass shall be used. Glass panels shall be arranged to minimize breakage and so that normal accumulation of residue on the exposed surface of a panel will not be raised to 200º F by the heat from the source of the illumination. CFC 1504.6.2.
8. Portable electric lamps shall not be used in spraying areas during a spraying operation. CFC 1504.6.2.4.
9. Metal parts of spray booths, exhaust ducts, and piping systems conveying Class I or Class II liquids shall be electrically grounded in accordance with the National Electrical Code. CFC 1503.2.5.
10. Spraying areas shall be provided with mechanical ventilation adequate to prevent the dangerous accumulation of vapors. CFC 1504.7.
11. Mechanical ventilation shall be kept in operation at all times while spraying operations are being conducted and for a sufficient time thereafter to allow vapors from drying coated articles and finishing material residue to be exhausted. CFC 1504.7.1.
12. Spraying equipment shall be interlocked with the ventilation of the spraying area such that spraying operations cannot be conducted unless the ventilation system is in operation. CFC 1504.8.
13. Recirculation ventilation systems shall have approved vapor detection systems. If the approved vapor concentration in the re-circulated air stream exceeds 25 percent of the lower flammability limit, the system shall automatically shut down the spraying operation, switch the ventilation system to 100 percent outdoor exhaust and sound an alarm. CFC 1504.7.2.
14. Ventilation systems shall be designed, installed and maintained such that the average air velocity over the open face of the booth, or booth cross section, in the direction of airflow during spraying operations shall not be less than 100 lineal feet per minute. CFC 1504.7.3.
15. Portable fire extinguishers shall be provided for spraying areas in accordance with the requirements for an extra (high) hazard occupancy (e.g., 4A:40B:C within 30 feet of the booth). See CFC Standard 101, CFC 1504.4.1 and 906.
16. Spray booths and spraying rooms shall not be alternately used for the purpose of drying arrangements which would cause a material to increase the surface temperature of the spray booth or room unless used for automobile refinishing in accordance with Section CFC 1504.6.1 1504.6.1.2.2